

Abstract

In an internal combustion engine provided with a variable valve mechanism that variably controls at least an operating characteristic (valve lift amount and the like) of an intake valve, a valve opening area A_{Wm} at a valve overlap time is calculated based on a valve lift amount (VCS-ANGL) and opening timing IVO of the intake valve, and a spit-back gas amount W_m at the valve overlap time is calculated based on the valve opening area A_{Wm} . On the other hand, a volume flow ratio (basic actual engine volume flow ratio) $R_{QH0VEL1}$ in the intake valve, equivalent to an actual intake air amount of the engine, is calculated based on the valve lift amount and closing timing of the intake valve, and a basic residual gas amount W_{cyl} is calculated based on the basic actual engine volume flow ratio $R_{QH0VEL1}$. Then, a resultant obtained by adding the spit-back gas amount W_m and the basic residual gas amount W_{cyl} , is set as a total residual gas amount of the engine. Further, in the case where an intake air amount control is performed by the variable valve mechanism, a target valve operating characteristic is set based on a target intake air amount which is set according to an operating condition of the engine, and the variable valve mechanism is controlled so that the valve operating characteristic of the intake valve reaches the target valve operating characteristic. At the moment, by executing a residual gas based correction to set the target valve operating characteristic, a high accurate intake air amount control is realized.